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**REMARKS**

This response is intended as a full and complete response to the non-final Office Action mailed July 7, 2005. In the Office Action, the Examiner notes that claims 1-22 are pending and rejected. By this response, Applicant has herein amended claims 1-2, 7-8, 11-12, 15, and 20-21. Claims 3-6, 9-10, 12-14, 16-19, and 22 continue unamended.

In view of both the amendments presented above and the following discussion, Applicant submits that none of the claims now pending in the application are anticipated or obvious under the provisions of 35 U.S.C. §102 and §103

It is to be understood that Applicant, by amending the claims, does not acquiesce to the Examiner's characterizations of the art of record or to Applicant's subject matter recited in the pending claims. Further, Applicant is not acquiescing to the Examiner's statements as to the applicability of the art of record to the pending claims by filing the instant responsive amendments.

**REJECTIONS****35 U.S.C. §102****Claims 1, 6-10, 14-20 and 22**

The Examiner has rejected claims 1, 6-10, 14-20 and 22 under 35 U.S.C. §102(e) as being anticipated by Whinnett et al. (U.S. Patent 6,317,411, hereinafter "Whinnett"). Applicant respectfully traverses the rejection.

In general, Whinnett discloses a method for wireless data communication between a base station and a subscriber unit in a wireless communication system. According to the method of Whinnett, groups of symbols in an input data stream are commutated to produce a plurality of commutated data streams. The plurality of commutated data streams are then transformed to produce a plurality of transformed data streams.

Whinnett, however, fails to teach or suggest each and every element of Applicant's invention of at least claim 1. Namely, Whinnett fails to teach or suggest at least the limitation of "wherein each transmit sequence of a particular

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transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair," as taught in Applicant's invention of at least claim 1. Specifically, Applicant's claim 1 recites:

"1. A method for use in a system adapted to transmit at least four series of transmit sequences over at least four transmit antennas, the method comprising the step of:

space-time coding at least two pairs of symbol sub-streams, each of the pairs of symbol streams being space-time coded to form a respective pair of the transmit-sequence chains, the space-time coding being such that at least one of the formed pairs of the transmit-sequence chains is a function of symbols of the respective pair of symbol sub-streams and not a function of the symbols of the other pairs of the symbol sub-streams;

wherein each transmit sequence of a particular transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub stream pair."

(Emphasis added.)

As taught in Applicant's invention of at least claim 1, each transmit sequence of a particular transmit sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair. For example, as taught in Applicant's specification:

"In an illustrative embodiment of the invention, each transmit sequence of a particular transmit-sequence chain is formed from 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the pair. The symbol of 1) and symbol complex conjugate of 2) form a transmit sequence having a duration of four symbol periods. Four transmit sequences—two transmit sequences formed from each of two symbol-sub-stream pairs—may be arranged as transmission matrix **B**. Each row of the matrix corresponds to a transmit antenna. The elements of each row represent the symbols that are transmitted by the respective antenna in four symbol periods. The matrix **B** is arranged as follows:

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	T1	T2	T3	T4
Antenna 1	$b_1$	$b_1$	$-b_2^*$	$-b_2^*$
Antenna 2	$b_2$	$b_2$	$b_1^*$	$b_1^*$
Antenna 3	$b_3$	$-b_3$	$-b_4^*$	$b_4^*$
Antenna 4	$b_4$	$-b_4$	$b_3^*$	$-b_3^*$

where  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$  are the symbols derived from a respective one of four symbol sub-streams, and  $b_1^*$ ,  $b_2^*$ ,  $b_3^*$ , and  $b_4^*$  are, respectively, the complex conjugate of the aforementioned symbols. The rows of the matrix represent the different transmit sequences, while the columns represent different symbol periods ( $T_i$ ,  $i=1 \dots 4$ ).” (Specification, Pg. 2, Line 18 – Pg. 3, Line 7).

For example, based on matrix B above, the transmit sequence associated with Antenna 1 is a function of a symbol ( $b_1$ ) of one of the symbol sub-streams ( $b_1$  sub-stream) of the respective symbol sub-stream pair ( $b_1/b_2$  symbol sub-stream pair) and a complex conjugate of a symbol ( $-b_2^*$ ) of the other symbol sub-stream ( $b_2$  sub-stream) of the respective symbol sub-stream pair ( $b_1/b_2$  symbol sub-stream pair). Similarly, the transmit sequence associated with Antenna 2 is a function of a symbol ( $b_2$ ) of one of the symbol sub-streams ( $b_2$  sub-stream) of the respective symbol sub-stream pair ( $b_1/b_2$  symbol sub-stream pair) and a complex conjugate of a symbol ( $b_1^*$ ) of the other symbol sub-stream ( $b_1$  sub-stream) of the respective symbol sub-stream pair ( $b_1/b_2$  symbol sub-stream pair).

By contrast, Whinnett teaches that either symbols from each sub-stream in a respective pair of symbol sub-streams are transmitted in a symbol sequence over an antenna or complex conjugates of symbols from each sub-stream in a respective pair of symbol sub-streams are transmitted in a symbol sequence over an antenna. Whinnett is completely devoid of any teaching or suggestion that each transmit sequence of a particular transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair.

In particular, Whinnett teaches that a transmit sequence is a function of a symbol of one of the symbol sub-streams of a symbol sub-stream pair and a symbol of the other symbol sub-stream of the symbol sub-stream pair. For

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example, as depicted in FIG. 5 of Whinnett, the transmit sequence transmitted over antenna 100 consists of the sequence  $S_1, S_1, S_2, S_2$ . This transmit sequence is a function of symbols from each of the respective symbol sub-streams in the pair of symbol sub-streams. There is no teaching or suggestion of a complex conjugate of a symbol of one of the symbol sub-stream of the symbol sub-stream pair.

Similarly, Whinnett teaches that a transmit sequence is a function of a complex conjugate of a symbol of one of the symbol sub-streams of a symbol sub-stream pair and a complex conjugate of a symbol of the other symbol sub-stream of the symbol sub-stream pair. For example, as depicted in FIG. 5 of Whinnett, the transmit sequence transmitted over antenna 102 consists of the sequence  $-S_2^*, -S_2^*, S_1^*, S_1^*$ . This transmit sequence is a function of the complex conjugates of symbols from each of the respective symbol sub-streams in the pair of symbol sub-streams. There is no teaching or suggestion of a symbol of one of the symbol sub-streams of the symbol sub-stream pair.

Thus, the teachings of Whinnett are completely different from the teachings of Applicant's invention of at least claim 1. Whinnett is completely devoid of any teaching or suggestion of at least the limitation of "wherein each transmit sequence of a particular transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair," as taught in Applicant's invention of at least claim 1. As such, Whinnett fails to teach or suggest each and every element of Applicant's invention, as arranged in the claim.

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim" (Lindemann Maschinenfabrik GmbH v. American Holst & Derrick Co., 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added)). The Whinnett reference fails to disclose each and every element of the claimed invention, as arranged in the claims.

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As such, Applicant submits that independent claim 1 is not anticipated and fully satisfies the requirements of 35 U.S.C. §102 and is patentable thereunder. Furthermore, independent claims 10 and 20 recite features substantially similar to the features of claim 1. As such, for at least the reasons discussed above with respect to claim 1, independent claims 10 and 20 are also not anticipated by Whinnett and fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

As such, Applicant submits that claims 1, 10, and 20 are not anticipated and fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder. Furthermore, claims 6-9, 14-19, and 22 depend, either directly or indirectly, from independent claims 1, 10, and 20 and recite additional features therefor. As such, and for at least the same reasons as discussed above with respect to claim 1, Applicant submits that these dependent claims are also not anticipated and fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder. Therefore, Applicant respectfully requests that the rejection be withdrawn.

### **35 U.S.C. §103**

#### **Claims 2-5, 11-13 and 21**

The Examiner has rejected claims 2-5, 11-13 and 21 under 35 U.S.C. §102(e) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over Whinnett. Applicant respectfully traverses the rejection.

For at least the reasons discussed above with respect to claims 1, 10 and 20, Applicant submits that Whinnett fails to teach or suggest each and every element of Applicant's invention. Namely, Whinnett fails to teach or suggest at least the limitation of "wherein each transmit sequence of a particular transmit-sequence chains is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol-sub-stream pair," as taught in Applicant's invention of at least claim 1.

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The Examiner asserts that that "Whinnett discloses substream pairs are complex conjugates and portions of the four transmit sequence chains are representable [where] each row of a matrix represents one transmit sequence of a different one of the transmit sequence chains (see column 6, lines 7-21 where this is interpreted as equivalent). Applicant's claimed invention appears to be an obvious variation of the orthogonal technique and would have been obvious to one of ordinary skill in the art." (Office Action, Pg. 5). The Applicant respectfully disagrees.

For at least the reasons discussed herein with respect to claim 1, Whinnett is completely devoid of any teaching or suggestion of the limitation "wherein each transmit sequence of a particular transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub-stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair," as taught in Applicant's invention of at least claim 1. Furthermore, there is no motivation whatsoever to modify the Whinnett reference.

Moreover, the Examiner has failed to provide any discussion at all of this limitation of Applicant's invention of at least claim 1. The Examiner merely states that Applicant's invention is an obvious variation of an orthogonal technique. The mere mention of an orthogonal technique, however, in no way teaches, shows, or suggests Applicant's claimed limitation. In fact, the delineation of the symbols of which a transmit-sequence chain is a function simply cannot be taught or even suggested using a variation of an orthogonal technique. Thus, Applicant submits that the basis for the Examiner's obviousness rejection of claims 2-5, 11-13 and 21 relying on Whinnett is improper. As such, Whinnett fails to teach or suggest Applicant's invention, as a whole.

As such, Applicant submits that claim 1 is not obvious over Whinnett and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, independent claims 10 and 20 recite features substantially similar to the features of claim 1. As such, for at least the reasons discussed above with respect to claim 1, independent claims 10 and 20 are also not obvious over

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Whinnett and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Furthermore, claims 2-5, 11-13 and 21 depend, either directly or indirectly, from independent claims 1, 10 and 20 and recite additional limitations therefor. As such, at least for the reasons discussed above with respect to independent claims 1, 10 and 20, Applicant submits that dependent claims 2-5, 11-13 and 21 also are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

### **SECONDARY REFERENCES**

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to Applicant's disclosure than the primary references cited in the Office Action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this Office Action.

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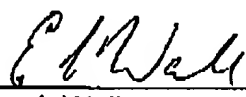
### CONCLUSION

Thus, Applicant submits that none of the claims presently in the application are anticipated or obvious under the respective provisions of 35 U.S.C. §102 and §103. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Eamon J. Wall at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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Eamon J. Wall  
Registration No. 39,414  
Attorney for Applicants

MOSER, PATTERSON & SHERIDAN, LLP  
595 Shrewsbury Avenue, Suite 100  
Shrewsbury, New Jersey 07702  
Telephone: 732-530-9404  
Facsimile: 732-530-9808